

PATTERNS OF APPROACHES TO DIGITAL TRANSFORMATION: AN INSTITUTIONAL ARRANGEMENTS PERSPECTIVE*

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ABSTRACT: *Companies face huge challenges in managing their digital transformation in terms of key actors, their roles and the way they interplay. Based on a survey of 181 large and medium-sized Slovenian companies, we discover six differently successful organizational patterns. The most successful identified pattern is the business-IT partnership approach, where top management and the IT department are responsible for the digital transformation, and the CIO is an orchestrator and a member of top management. However, this is not the only possible successful approach for digital transformation. Recommendations and possible evolutionary paths for companies in each pattern are also outlined in the paper, including the importance of orchestrating the activities and actors of digital transformation and its strategic role.*

Key words: *digital transformation; organizational patterns; CIO; CDO; IT department; digital strategy; digital maturity*

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1 INTRODUCTION

Although digital transformation is often seen as just another buzzword, it has certainly increased top executives' interest in IT-related matters. Companies around the world have started to digitally transform or are at least interested in considering it. Some research revealing the positive influence of digital transformation on organizational performance

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has already been done, e.g., Chen et al. (2016). Digital transformation is not only about new technology (Hinings et al., 2018) but demands major changes in strategy, business models, processes, and organizational structures (Westerman et al., 2011), as well as a reassessment of a company's norms and values (Liu et al., 2011). Companies therefore encounter huge challenges in managing their digital transformation.

Digital transformation elevates IT-related matters to a more strategic level (Peppard, 2018). It is no longer customary for only the Chief Information Officer (CIO) and the IT department to be in charge of such matters, lately the CEO and other members of top management (Whitler et al., 2017) and other departments (Sousa & Rocha, 2019) also wish to actively partake (Dumeresque, 2014). Therefore, companies need to establish strategies, organizational structures, and management practices to govern these complex transformations (Matt et al., 2015). Since most complex organizational changes require collaboration (Seijts & Gandz, 2018), new institutional arrangements are emerging (Hinings et al., 2018), although it is difficult for practitioners to know which approach is best for their companies.

Little is known about the actors in digital transformation, their roles and connections (Kohli & Melville, 2019). Recommendations vary and sometimes contradict each other, therefore further research is needed to clarify how companies should transform (Ismail et al., 2017). Although some call for new positions to be established, for example, a Chief Digital Officer (CDO) and bimodal IT (Horlach et al., 2016), others suggest the existing structures should assume responsibility for the digital transformation (Tumbas et al., 2017). Further, Matt et al. (2015) state that the actors and organizational patterns of digital transformation and their success should be further investigated.

Therefore, our research aimed to investigate how companies institutionalize digital transformation through dimensions identified in previous research: top management involvement, CIO involvement, establishment of the CDO position, role of the IT department, and the presence of a digital strategy. Thus, we wanted to explore typical combinations of key actors in digital transformation, their roles and interplay and to examine which combinations are connected with higher digital maturity.

Based on a survey of large and medium-sized companies conducted in 2017, we examined who the key actors of digital transformation within companies are, as well as their roles and interplay. Besides actors of digital transformation and digital maturity, the questionnaire covered also the understanding of the digital transformation, current state, approaches, plans and key barriers. For this paper only parts of the questionnaire were used. They are presented in the appendix. The analysis, which included some steps of multi-value Qualitative Comparative Analysis (mvQCA) (Rihoux & Ragin, 2009) and different statistical methods, revealed there is not simply one approach to digital transformation; rather, six organizational patterns with different levels of success were discovered.

Besides that, additional characteristics were revealed for each pattern that are also described in the paper. We also discuss how several of the organizational patterns so identified lead to successful transformation; yet, they require different sets of approaches and coordinating activities. Finally, we discuss possible evolutionary paths for companies to consider when seeking to achieve higher levels of digital maturity either through their existing pattern or by evolving to a different pattern with a greater digital maturity potential.

The remainder of the paper is structured as follows. In the next section, we discuss the theoretical foundations of the institutional arrangements of digital transformation, highlight previous findings from the literature and conclude with research questions. The subsequent section describes the research design and methodology. Then, we present the results and discuss the findings and implications. The paper concludes with suggestions for future research.

2 LITERATURE BACKGROUND AND RESEARCH QUESTIONS

2.1 ACTORS AND INSTITUTIONAL ARRANGEMENTS IN THE CONTEXT OF DIGITAL TRANSFORMATION

In essence, digital transformation is an approach to organizational change with an information-centric focus (Glazer, 1991) where IT plays a pivotal role. Digital transformation can be defined as the process through which companies converge multiple new digital technologies, enhanced with ubiquitous connectivity, with the intention of reaching superior performance and sustained competitive advantage, by transforming multiple business dimensions, including the business model, the customer experience and business processes (Ismail et al., 2017). While digital transformation finds its roots in the 1990s (Muzyka et al., 1995), the degree of complexity of current initiatives in this area exceeds that of previous IT-enabled transformations (Ismail et al., 2017). They are even more complex than the radical changes brought by the widespread business process reengineering (BPR) movement (Ismail et al., 2017) during the 1990s, following the work of Hammer (1990), Davenport (1993) and others, but which ended in many unsuccessful projects (Al-Mashari & Zairi, 1999). Similarly, as with previous IT-enabled transformations, the success of digital transformation depends largely on the particular approaches companies take (Ismail et al., 2017).

Lusch and Nambisan (2015) emphasize that the focus of such transformation has shifted to the value (or the experience) several actors create together in a collaborative process. From the service-dominant logic (Vargo & Lusch, 2004, 2008) perspective, digital transformation is about applying the capabilities and skills of the actors to the needs and desires of others within the company (Lusch & Nambisan, 2015). Thus, service-dominant logic (Vargo & Lusch, 2004, 2008) offers an appropriate framework for analyzing various aspects of how companies tackle digital transformation internally.

Structures that actors create through their activities are considered to be one of the building blocks of the framework of service innovation (Lusch & Nambisan, 2015). Vargo and Lusch (2016) further argue that institutions, coordinating mechanisms of various types, and institutional agreements, interdependent assemblages of institutions, represent the most important features of these structures and the foundational enablers of value co-creation. Value-creating actors are coordinated through institutions and institutional arrangements. Furthermore, Storbacka et al. (2016) point out that the need exists for the evaluation of resource integration patterns in the context of digital transformation because it drives novel forms of engagement, which is in line with transdisciplinary vectors of service-dominant logic diffusion identified by Vargo and Lusch (2017).

Research reveals several important actors and institutional roles that are studied individually, along with their roles and responsibilities in a digital transformation context. Some suggestions can be found in the scarce literature (Kohli & Melville, 2019; Matt et al., 2015) in this field. However, to the best of our knowledge, none of these studies examines the interplay or coordination of these various actors and their roles in co-creating value by way of digital transformation. We briefly summarize prior research on the roles of CEOs and other top management members, the CIO, CDO and similar new positions, and the digital transformation strategy.

Gerth and Peppard (2016) and Matt et al. (2015) claim that CEOs and other top management members should be actively involved and possess knowledge of different technology types (Sousa & Rocha, 2019). Recently, members of top management have become more involved in IT-related matters (Turel & Bart, 2014) as seen in an increasing digital focus and a more strategic direction for IT among the CEOs of many companies (Gerth & Peppard, 2016), which results in increased organizational performance (Turel & Bart, 2014). However, the idea that the CEO and other top management members should be involved in IT-related matters to increase organizational performance is not new. A research by Byrd (2003) confirms that top management's support for IT-related initiatives positively impacts organizational performance. Furthermore, Weill and Ross (2004) developed the concept of IT governance which strongly encourages top management's involvement in certain IT-related decisions. Their research also shows that the level of top management involvement in IT-related matters is higher in companies with superior performances (Weill & Ross, 2005).

Becker (2018) suggests companies need a member of top management who provides specific expertise and encourages digital transformation. In some companies, the CIO takes on this role (Tumbas et al., 2017); however, a gap often exists between the CEO's expectations of IT and its current performance (Gerth & Peppard, 2016; Krotov, 2015) and, therefore, CIOs are thought to be unsuitable for leading a digital transformation (Singh & Hess, 2017). This is probably true for some of them because the traditional responsibilities of a CIO include managing the operation of the IT infrastructure (Peppard et al., 2011), yet digital transformation goes above and beyond this and calls for different mindsets and skills (Singh & Hess, 2017). Gerth and Peppard (2016) discovered three

distinct roles based on the level of the CIO's strategic influence; namely, service provider, solution provider, and strategic contributor. To be the spearhead of digital transformation, CIOs must be strategic contributors and thus need more business knowledge and skills (Dumeresque, 2014; Indihar Štemberger et al., 2011; Krotov, 2015).

To deal with the challenges of digital transformation, some organizations appoint new positions, typically a CDO with the role of driving the organization's digital agenda and being the orchestrator of both the IT department and all other departments (Dumeresque, 2014). Some CDOs work alongside CIOs (Hess et al., 2016), whereas others upgrade or even replace the CIO role (Gerth & Peppard, 2016). Tumbas et al. (2017) find that the typical reason for appointing a CDO is the IT departments' preoccupation with large-scale infrastructural projects or the organization has many localized digital initiatives but lacks an overall strategic direction.

Gerth and Peppard (2016) analyzed the possible reasons of shrinking the CIO's business and strategic roles or even replacing the CIO with a CDO and report five particular causes: misunderstanding the transition, ambiguity in defining IT success, ambiguity in role expectations, poor relationship management with peers, and pushing change at the wrong pace. On the other hand, Tumbas (2017) reports there is no need for CDOs in organizations where CIOs have found a way to both drive the digital transformation and take care of the IT infrastructure. In any case, the role of one of the key digital transformation actors must be more business oriented, representing both the business and IT sides (Horlach et al., 2016) irrespective of whether they are called the CDO or the CIO (Gerth & Peppard, 2016).

The analysis in Peppard (2018) reveals that IT organized as a separate organizational unit responsible for keeping IT infrastructure functioning (a technologically-oriented IT department) no longer meets the requirements for generating business value from IT. In the era of digital transformation, IT departments and their heads must become more business-oriented and seek to manage around their boundaries by establishing a partnership between business and IT (Manfreda & Indihar Štemberger, 2019). Moreover, Peppard (2018) suggests that companies adopt pervasive ways of organizing IT, which spread through the entire company, and that CIOs should take on the role of an orchestrator. In addition, Horlach et al. (2016) reveal the necessity of having a bimodal IT operation where digital IT and traditional IT, sometimes referred to as "two-speed IT," coexist. However, contrary to what one might expect, Gerth and Peppard (2016) observe that IT departments are losing their business role and adopting a more technological one.

An important way of coping with the complexity of digital transformation is to formulate a digital transformation strategy that provides a central concept for integrating the entire coordination, prioritization, and implementation of digital transformations within a firm (Matt et al., 2015). It is a company-spanning strategy formulated to enable a company to incorporate the opportunities of the digital technology by leveraging digital resources and

capabilities. Although many companies have developed a separate digital transformation strategy and many consultants have been involved in these initiatives, digital transformation strategy should be aligned to both business strategy and a firm's resources (Yeow et al., 2018). Several researchers (e.g., Bharadwaj et al., 2013; Ismail et al., 2017; Kane et al., 2016) suggest the digital transformation strategy should be closely integrated, or even become part of the corporate strategy.

2.2 Digital maturity

Maturity assessment is used to measure the existing maturity level of a particular aspect in an organization in order to identify strengths and improvement options to reach even higher maturity levels (Proença & Borbinha, 2016). Therefore, maturity models were developed to measure the progress that an organization achieves in its continuous improvement endeavors (Kosieradzka, 2017). The level of digital transformation development can be measured as digital maturity (Mettler & Pinto, 2018), which is similar to other maturity models connected with IT (J. Becker et al., 2009), for example BPM maturity or BI maturity.

Several maturity models are emerging in the area of digital transformation, for example, IDC's five dimensional digital maturity model focusing on planning and governance, customer experience, managing talent, connectivity between internal and external systems, and information architecture (Magee et al., 2015), Forrester's Digital Maturity Model 4.0 focusing on culture, technology adoption, organizational alignment and insights (Gill & VanBoskirk, 2016), the Digital Asset Management (DAM) maturity model emphasizing human roles, information, systems and processes (Proença & Borbinha, 2016), a digital maturity model for telecommunications service providers focusing on strategy, organization, customer, ecosystem, operations, technology and innovation (Valdez-de-Leon, 2016), and others. Despite the fact that there is no commonly agreed-upon definition for the digital maturity concept (Mettler & Pinto, 2018), the models are converging on emphasizing the process of adapting to the changing digital environment. Kane et al. (2015) use the characterization of "an ideal organization transformed by digital technologies and capabilities that improve processes, engage talent across the organization, and drive new and value-generating business models." Therefore, digital maturity is not merely implementing new technology, but rather aligning organizational strategy, culture and technology to meet the digital expectations of different stakeholders (Kane et al., 2017). Nevertheless, Kane et al. (2015) claim that the distinction between companies with high and low digital maturity is based more on strategy, culture and talent development than the use of technology. Moreover, digital maturity presents an asset for engaging with different actors and discussing improvement initiatives beyond focusing on technologies only (Mettler & Pinto, 2018).

Given the importance of various aspects when considering digital maturity, we used the IDC's five level digital maturity model (Magee et al., 2015), which measures the

aforementioned five dimensions. According to this model, digital transformation thus requires companies to maintain a comprehensive view of all five dimensions and ensures cooperation between them. The five dimensions of the chosen model are also in line with the characterization of digital maturity by Kane et al. (2017).

2.3 Research questions

Findings about institutional arrangements of digital transformation can have an important theoretical and practical contribution. As we can see from the above literature review, suggestions about possible successful institutional arrangement are quite diverse. Therefore, we argue that not only one arrangement is best for all companies, but several successful approaches to organizing digital transformation and institutional arrangement patterns are possible. This is in line with the framework proposed by Sinha and Van de Ven (2005), who argue that sets of equally effective work designs for different combinations of inputs should be studied, thus giving managers different work design options. We wanted to discover the patterns that lead to equal effectiveness (higher digital maturity) while using different work design approaches. More precisely, we wanted to explore the following topics:

Q1. What are typical combinations of key actors in digital transformation, their roles and interplay?

Q2. Which patterns are connected with higher digital maturity?

Q3. How are organizational patterns related to digital transformation strategy, and what other characteristics do they have?

This research can contribute to the body of knowledge about actors and institutional arrangement of digital transformation in the framework of service-dominant logic (Vargo & Lusch, 2004, 2008). Furthermore, it can offer practitioners more information about suitable approaches to digital transformation for their companies.

3 RESEARCH METHODOLOGY

In order to investigate how companies seek to digitally transform themselves, we conducted a survey among large and medium-sized Slovenian companies during the summer of 2017. The questionnaire was based on previously developed questionnaires (Indihar Štemberger et al., 2011; Kane et al., 2016; Magee et al., 2015). We sent the questionnaire to the whole population of 1,389 such companies and asked the recipients to forward it to the highest-ranking employee in their organization responsible for digital transformation. We received a total of 196 responses from companies which had already started their

digital transformation. Most responses came from CIOs, business executives or business managers.

The questionnaire was based on previously developed questionnaires and consisted of the following parts: digital transformation (Kane et al., 2016), digital maturity (Magee et al., 2015), and the role and state of IT (Indihar Štemberger et al., 2011). Since we wanted to investigate the patterns of digital transformation, we excluded the responses in which nobody was responsible for digital transformation, as these companies were obviously not involved in digital transformation. Besides that, we also excluded the responses in which the respondents did not know who was responsible for digital transformation, as we found them unreliable due to the respondents' potential lack of knowledge about the subject. Based on these criteria, we eliminated 15 responses and continued the analysis with 181 units. Table 1 shows the general characteristics of the companies included in the final sample.

Table 1: *Characteristics of the sample*

		Size	Share in %
Size (number of employees)	Less than 250 (Mid-sized)	129	71 %
	250 or more (Large)	52	29 %
Position of the respondent	Business executive	27	15 %
	CIO	56	31 %
	Business manager	47	26 %
	IT employee	15	8 %
	Non-IT employee	36	20 %
Industry sector	Primary	7	4 %
	Secondary	70	39 %
	Tertiary	104	57 %

The successfulness of digital transformation was measured with the digital maturity model developed by Magee et al. (2015), which is based on self-assessment. In order to select the right methods for further analysis, we tested the variable digital maturity for normality by Kolmogorov-Smirnov and Shapiro-Wilk tests. The results showed that the data was probably not normally distributed (see Table 2). Therefore, non-parametric tests were used for further analysis.

Table 2: *Tests of normality for the dependent variable*

Variable	Test	Statistics	df	Sig.
Digital maturity	Kolmogorov-Smirnov	0.086	181	0.002
	Shapiro-Wilk	0.988	181	0.123

For further analysis, we applied different statistical methods to analyze survey data by using IBM SPSS Statistics 24. In order to discover typical combinations of key actors in digital transformation – typologies or patterns, we also applied some steps of multi-value Qualitative Comparative Analysis (mvQCA) (Rihoux & Ragin, 2009; Fiss, 2011) and the Tosmana software. For testing the statistical significance of differences in digital maturity among various groups, we used the Mann-Whitney U test in the case of two groups, and the Kruskal-Wallis test in the case of three or more groups. The Mann-Whitney U test is a non-parametric test that compares differences between two independent groups when the dependent variable is either ordinal or continuous, but not normally distributed (Hair et al., 2010). Similarly, the Kruskal-Wallis test is also a non-parametric test for the one-way analysis of variance used to determine if three or more samples originate from the same distribution (Hair et al., 2010).

4 DATA ANALYSIS

4.1 Exploring the data

To explore which approaches to digital transformation are more successful, we first checked the differences in digital maturity according to different actors' responsibilities for such a transformation. Respondents could select up to three answers from the list in the survey: the CEO or other member of top management, the CDO, the IT department, the Marketing department, the R&D department, other, nobody, or do not know. The latter two were excluded from further analysis, because these companies were obviously not involved in a digital transformation. The results of digital maturity according to the different actors' responsibilities for digital transformation together with the number of companies in each group are presented in Table 3. We also examined whether these differences are statistically significant and found they are not. Even the minority of the 15 companies with an established CDO position does not stand out as being higher in digital maturity.

Table 3: *Digital maturity according to different actors' responsibilities for digital transformation*

Responsible	Yes		No		Mann-Whitney U test	
	N	Digital Maturity	N	Digital Maturity	U	Sig.
CEO	99	2.80	82	2.92	3674.500	0.272
Other member of top management	58	2.98	123	2.80	3037.000	0.106
CDO	15	2.77	166	2.86	1154.000	0.639
IT department	110	2.93	71	2.75	3382.000	0.128
Marketing department	21	2.87	160	2.85	1630.000	0.824
R&D department	20	2.91	161	2.85	1540.000	0.751

While at first glance it looks as if the responsibility of different actors for digital transformation is not connected with digital maturity, we decided to further analyze the data to detect any patterns in the frequent combinations of these actors and other elements in which digital maturity is higher. We decided to include top management as a possible key actor because the literature gives considerable support for the notion that top management should be responsible for digital transformation. For similar reasons, we decided to include the IT department as a possible crucial actor. We also found, surprisingly, that IT departments are frequently not responsible for digital transformation and wanted to further investigate this.

Therefore, we split the sample into two groups according to whether anyone in top management was responsible for digital transformation. Digital maturity for each group is presented in Table 4. As we can see, digital maturity is higher if top management is responsible for digital transformation; however, the difference is not statistically significant.

Table 4: *Digital maturity according to the responsibility of top management for digital transformation*

Top management responsible		Top management not responsible		Mann-Whitney U test	
N	Digital Maturity	N	Digital Maturity	U	Sig.
137	2.88	44	2.78	2701.000	0.300

In the next step, we further investigated the responsibility of IT departments. Some companies had completely outsourced their IT and therefore did not have an IT department. Therefore, we divided the sample into three groups: (1) IT department responsible for digital transformation, (2) IT department not responsible for digital transformation, and (3) no IT department. The results about digital maturity in these groups are presented in

Table 5. Since there were three groups, we used the Kruskal-Wallis test. As we can see from Table 5, digital maturity is much lower in companies which are without an IT department ($p < 0.001$). Moreover, we were surprised to find that in one third of the cases where companies do have IT departments, they are not responsible for digital transformation.

Table 5: *Digital maturity according to the responsibility of the IT department for digital transformation*

IT department responsible		IT department not responsible		No IT department		Kruskal-Wallis test	
N	Digital Maturity	N	Digital Maturity	N	Digital Maturity	H(2)	Sig.
110	2.93	53	2.94	18	2.20	17.876	0.000

We further investigated the differences in digital maturity among companies. We wanted to see whether the position of the highest-ranking employee responsible for IT (CIO) was connected with digital maturity; therefore, we investigated digital maturity according to the CIO's position in the hierarchy. As we can see from the results presented in Table 6, digital maturity is higher ($p < 0.05$) in companies wherein the CIO is a member of top management.

Table 6: *Digital maturity according to the position of the highest-ranking employee responsible for IT (CIO)*

In top management		Lower in hierarchy		Mann-Whitney U test	
N	Digital Maturity	N	Digital Maturity	U	Sig.
36	3.10	145	2.80	1933.500	0.016

4.2 Detecting patterns

While at first glance it looks as if the responsibility of different actors for digital transformation is not directly related to digital maturity, we decided to further analyze the data to detect any patterns in the frequent combinations of these actors and other elements in which digital maturity is higher. To determine what typical combinations of key actors in digital transformation are, we applied the mvQCA method (Rihoux & Ragin, 2009). Since we were interested in typical combinations of key actors in digital transformation (RQ1) and not only which patterns are connected to higher digital maturity (RQ2), we applied only the first two steps of the method (Fiss, 2011): constructing a truth table, and reducing the number of truth table rows based on the minimum number of cases required for a solution to be considered. We formed the truth table based on three dimensions: (1) responsibility of top management for digital transformation, (2) responsibility of the IT department for digital transformation, and (3) the position of the CIO in the hierarchy.

Some rows in the truth table contained no cases — take, for example, a group in which the IT department is responsible for digital transformation, but top management is not, while the CIO is also a member of top management. We got a truth table with ten groups. As we were not interested in single cases or in very small groups, but in organizational patterns, by which we mean that they are large enough to be considered frequent, we combined groups from the truth table into larger ones if they were smaller than ten cases. As the result, we got six groups with distinct patterns about organizing digital transformation, which are presented in Table 7. We based the groups' names on the archetypes of the IT governance concept (Weill & Ross, 2004) because they are self-explanatory and well established.

Table 7: *Organizational patterns of digital transformation*

Name	Key actors and their roles	N	Others responsible	Digital Maturity	Digital transformation strategy	Size of companies
1 Business-IT partnership	Top management and IT department responsible, CIO in top management	31	In 19%, mostly marketing and R&D, also 1 CDO	3.20	Most companies (65%) include digital transformation in their business strategy. Digital maturity is higher (3.43) for this group. Only 16% do not have a digital transformation strategy.	Similar to the overall sample
2 Business-IT duopoly	Top management and IT department responsible, CIO not in top management	52	In 27%, mostly marketing and R&D, also 3 CDOs	2.77	The share of companies in each group is similar to that for the overall sample. Digital maturity is higher for groups that include digital transformation in their business strategies (3.02).	Similar to the overall sample
3 Business monarchy	Top management responsible, IT department not responsible	41	In 27%, mostly marketing and R&D, also 2 CDOs	3.00	The share of companies in each group is similar to that for the whole sample. Digital maturity is higher for groups that include digital transformation in their business strategies (3.37).	Similar to the overall sample
4 Business monarchy with outsourced IT	Top management responsible, IT outsourced	13	In 38%, mostly marketing and finance	2.20	The majority of companies (77%) do not have a digital transformation strategy.	Mostly mid-sized companies

Name	Key actors and their roles	N	Others responsible	Digital Maturity	Digital transformation strategy	Size of companies
5 IT monarchy	IT department responsible, top management not responsible	27	In 26% (7 cases), mostly R&D, also 4 CDOs	2.91	Only 11% of companies do not have a digital transformation strategy. The share of companies with a special digital strategy is higher (37%). Digital maturity is highest for the group that includes digital transformation in its business strategies (3.07).	More large companies
6 Feudalism	Neither top management nor IT department responsible	17	In all cases, mostly marketing and R&D, also 5 CDOs	2.57	A higher share of companies with a special digital strategy (35%) and a lower share of companies with digital transformation included in their business strategies (35%). Digital maturity is higher for companies with any kind of digital transformation strategy (2.81).	Mostly mid-sized companies

Statistically significant differences in digital maturity exist among the patterns. The greatest digital maturity (3.2) is found for the *Business-IT partnership* pattern, in which top management and the IT department are responsible for digital transformation and the CIO is a member of top management. In contrast, companies in the *Business monarchy with outsourced IT* pattern, in which top management is responsible for digital transformation and which do not have an IT department, have the lowest digital maturity (2.2). The *Feudalism* pattern, whereby digital transformation occurs without top management and also without an IT department, also displays very low digital maturity (2.57).

We further investigated the actors involved in digital transformation by examining who else is responsible for digital transformation in order to determine where a pervasive IT organization (Peppard, 2018) is emerging. One third of the sample contains other actors responsible for digital transformation, mostly marketing and R&D departments. However, the share of companies in which others were responsible for digital transformation (see Table 7, “Others responsible”) varies among the patterns. Since none of the key actors identified in other groups are responsible for digital transformation in the *Feudalism* pattern, others expectantly take on this role; however, their share is also high in the *Business monarchy with outsourced IT* pattern. On the other hand, their share is the lowest in the *Business-IT partnership* group. We can also see that CDOs are found in almost all patterns, but most of them are in the *IT monarchy* and *Feudalism* group, where top management does not take part in the team.

Further analyses revealed other characteristics of the patterns. Previous findings suggest the way the digital transformation strategy is devised and applied, also plays an important role in successful digital transformation initiatives. We divided the responses into three groups: (1) companies that include a digital transformation strategy in their business strategy (48% of companies); (2) companies that have a special digital transformation strategy (24%); and (3) companies without a digital transformation strategy (28%). Again, we calculated the mean values of digital maturity for each group and tested whether the differences were statistically significant. Digital maturity is highest for companies that include a digital transformation strategy in their business strategy (3.17), lower for companies with a special digital transformation strategy (2.76), and lowest for companies without any digital transformation strategy (2.39); the differences are statistically significant. One might expect that all organizations in patterns entailing top management involvement (*Business-IT partnership*, *Business-IT duopoly*, *Business monarchy* and *Business monarchy with outsourced IT*) included digital transformation in their business strategy, yet the analysis did not confirm this assumption. Nevertheless, some important differences were detected (see Table 7, “Digital transformation strategy”).

The final step was to inspect whether any characteristics of the patterns were connected with a company’s size. Only a few differences in individual patterns from the whole sample were discovered. These are also presented in Table 7.

5 DISCUSSION AND IMPLICATIONS

The results of this study reveal the existence of several organizational patterns of digital transformations in terms of key actors, their roles, and their interplay in co-creating the business value of digital transformation. While several of these patterns can lead to success, clearly not all patterns are equally suitable and some will typically not provide a good basis for achieving a high level of digital maturity. However, on their way to successful digital transformation, companies may consider different approaches to organize and coordinate activities depending on their current resources, knowledge, skills, technical and change management capabilities, organizational culture, etc. Moreover, different evolutionary paths for further development are possible.

5.1 Understanding the patterns

The **Business-IT partnership** pattern has the highest average value for digital maturity. These companies rely on the partnership type of IT department (Peppard, 2018) and the strategic role of the CIO (Gerth & Peppard, 2016), which seems to be the right approach to digital transformation. Their CIOs and IT departments have not only played an active role in implementing and managing new innovative IT and in developing IS, but also contribute to changing the business processes and business models. They apparently understand how IT contributes to the company’s success. Presumably, in these cases, the CIO has appropriate skills and has managed to take on the role of a digital transformation

orchestrator in addition to handling frequently required bimodal IT operations. This may also be the reason for the small number of CDOs in this group. At the same time, top management is actively involved in the digital transformation and thus in certain IT-related decisions. In these companies, the digital transformation has obviously become part of everyday business and the CIO–CEO gap (Krotov, 2015) has been bridged. The success of this group supports earlier findings (Dumeresque, 2014; Gerth & Peppard, 2016) about the importance of the CIO and the IT department's strategic and orchestration roles.

However, it appears that this is not the only organizational pattern that can lead to high levels of digital maturity. Also successful is the **Business monarchy** pattern, whereby the IT department is not responsible for digital transformation, but top management is. Here digital transformation is presumably understood as a business initiative. Not only is the IT department not a service provider (Gerth & Peppard, 2016), but it is also unable to cope with the business requirements for innovative and quick solutions (Tumbas et al., 2017). Instead, its role remains within the traditional IT world (Horlach et al., 2016). The business side apparently takes care of providing new innovative IT solutions either through external resources or internal emergent, technology-enabled, end-user computing (Peppard, 2018).

The importance of a strategic direction transformation has evidently become apparent in this group, particularly when included in the business strategy and not as a separate digital transformation strategy. When the strategic importance of digital transformation is recognized and digital transformation becomes an integral part of everyday business, top management apparently adopts the orchestration role and becomes actively involved in some IT-related matters and decisions. This also prevents uncoordinated localized digital initiatives that may not result in the strategic digital goals being achieved. Still, it looks that a pervasive IT organization is evolving in these companies, since in many of them other departments are also responsible for digital transformation.

In the **Business-IT duopoly** group, digital transformation relies more on the IT department, which shares responsibility for this with the top management. Nevertheless, this approach appears to be less successful than *Business-IT partnership*. In this case, the IT department frequently only plays the role of a service or solution provider. This is seen in the fact that the most senior person responsible for IT is not in top management and consistent with the findings of Gerth and Peppard (2016) that some IT departments are nowadays becoming even more focused on taking care of the IT infrastructure exclusively. It appears that a technologically-oriented IT department could be a barrier to digital transformation. The biggest challenge in this group seems to be the inadequate orchestration and interplay of different roles that do not support success in digital transformation.

Companies in the **Business monarchy with outsourced IT** group seem to be at the start of their digital transformation paths. Their IT has been outsourced; accordingly, IT was not strategically important in the past. As these are mostly mid-sized companies with limited resources and fewer opportunities to implement IT with the aim of gaining a competitive

advantage, their lagging is understandable. This is all reflected in their digital maturity levels being the lowest. However, these companies have recognized the possibilities of new digital technologies changing their business processes and models. Most have not yet defined any strategic directions for digital transformation, although it is important that top management is involved and responsible for these initiatives.

Based on the discussion of the previous groups, it may seem as though top management's direct responsibility for digital transformation is irreplaceable; however, the IT monarchy pattern proves the contrary. In this group, top management is not directly responsible for digital transformation. Yet, it seems that digital transformation is a strategic initiative in these companies because most companies in this group include it in their strategies. Top management recognizes the strategic importance of digital transformation, but probably does not accept it as a part of its daily activities. Instead, it appears that this responsibility has been transferred to other positions, mostly to the IT department and its head, that have to be strategic contributors or close to this level and be able to take on the role of an orchestrator. It is also not surprising that in these cases we quite frequently see CDOs or R&D alongside those responsible for digital transformation. They might also take on the roles of orchestrators (Singh & Hess, 2017) and try to bridge the gap between the business and IT sides. One reason for this situation may be that the size of the company and related complexity of management do not allow them to cope with these activities. The responsibility for digital transformation at lower hierarchical levels is also reflected in the more frequent standalone digital transformation strategy, wherein digital strategic directions are not an integral part of the overall business strategy.

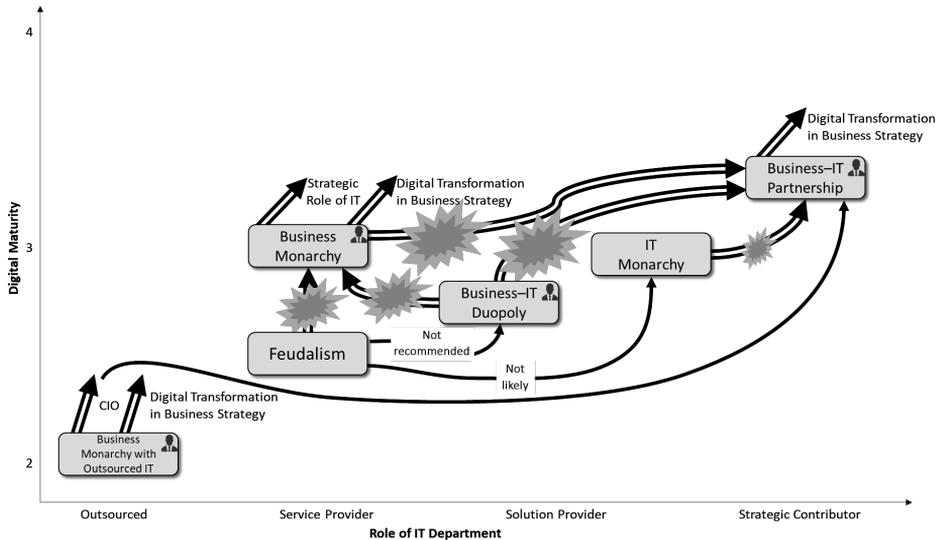
Finally, the **Feudalism** pattern of typically mid-sized companies with localized initiatives and a low digital maturity score was identified. Neither top management nor the IT department is responsible for the digital transformation of these companies. It seems that these initiatives are not strategic and also not orchestrated. Top management obviously has not recognized the strategic importance of digital transformation and IT departments are probably incapable of even being a part of it. Therefore, other actors apparently assume responsibility for digital transformation. However, like with IT governance archetypes (Weill & Ross, 2004), when each business unit makes independent decisions, the results cannot be good in the long run. But some of these companies appoint CDOs who can take on the role of an orchestrator.

5.2 Evolutionary paths

Organizations from all groups have the opportunity to further develop and improve their approach to digital transformation. Therefore, in the following we discuss possible paths of development or transitions between groups based on the characteristics of individual groups and the differences between them. The possible paths, their likelihood, and the barriers to transitions, as shown in Figure 1, are also derived on the basis of linking the findings of this research with previous insights from the literature on individual actors

and institutional roles of digital transformation. In some cases, improvements are possible within their group, whereas transitions between groups are often difficult and require radical changes, and are sometimes not possible without bringing in new employees.

Figure 1: (R)evolutionary paths of digital transformation patterns



Legend:

- Top management is (co-)responsible for digital transformation
- Recommended paths
- Possible paths
- Difficulty level of (r)evolution

Organizations in the **Business-IT partnership** group presumably have the best opportunity for progress towards a pervasive IT organization in which the CIO operates as an orchestrator (Peppard, 2018) since these organizations treat IT as highly important, and also understand the business-IT relationship. Currently, other departments are still relatively less involved (only 19% of companies in this group). Furthermore, the key step for these organizations is to embrace digital transformation as a normal business development and therefore include it in the business strategy.

Obstacles found on the path to successful digital transformation, created by the inadequate interplay of different roles in the case of **Business-IT duopoly**, can be significantly reduced with a strategic approach. For instance, suggestions about CMO-CIO alignment and the importance of the CEO's role in improving this relationship are discussed in Whitley et al. (2017). This may result in a higher level of digital maturity. Transition to the *Business-IT partnership* group, which is more digitally mature, is difficult since it is necessary to bridge the gap between business and IT, which calls for different knowledge and skills,

and often also a different mentality and understanding of the role of IT (Krotov, 2015; Manfreda & Indihar Štemberger, 2019). As a rule, it requires personnel changes since the IT department, especially the CIO, must be able to switch over to bimodal "two-speed" IT operations (Horlach et al., 2016).

On the other hand, transition to the *Business monarchy* group is somewhat easier as management may have already recognized the importance and taken part of the responsibility for digital transformation, which can be improved by involving other non-IT departments and establishing appropriate orchestration. Transition to the *Business-IT partnership* group, in fact, brings a revolutionary change in the role of the CIO and the IT department, which as regards the existing situation can hardly expect to go without changing its employees; that is also quite hard to absorb by the remaining parts of the organization. It is also unlikely to move in the direction of a pervasive IT organization as that would require a strong coordinator, namely a CIO orchestrator.

Although high levels of digital maturity may be achieved by an arrangement where IT is the main department responsible for digital transformation and not, top management (**IT monarchy**), these companies will need to change their approach to digital transformation from being IT project focused to constant transformation focused. It is crucial for top management to understand how digital technologies will impact their business and to recognize the nature of digital transformation for which major changes in strategy, business models, processes, and organizational structures are required. Consequently, they need to take their part and responsibility along this path and take advantage of the push from the IT side. By spotting this opportunity and the IT department's current position, they can establish a healthy relationship which can in turn result in moving towards the *Business-IT partnership* group with its higher digital maturity potential. Orchestrators, like CDOs, may help in this process.

Business monarchy can also provide a good environment for digital transformation mainly due to digital transformation being understood as strategic. However, in the long run, this pattern can lead to inadequate IT governance or inconsistency and a lower level of integration of new processes and models with existing ones because the IT department is excluded. This may also lead to problems in implementing business processes. In this case, IT can have a constraining role (Eardley et al., 2008). Yet, organizations in this group hold the greatest potential for developing in the direction of a pervasive IT organization by including other non-IT departments, although this might also pose a risk of developing towards *Feudalism*. In such a situation, it is vital that top management coordinates activities and orchestrates the roles played by different actors during the digital transformation. The latter can be easier where proper basis is detailed in the strategic guidelines for the digital transformation. Thus, including the strategic goals of digital transformation in the business strategy is the most important step in this group for raising the level of digital maturity. In order to ensure the long-term coordination of IT development, it is advisable to move towards increasing the IT department's strategic role which, in the presence of

proper leadership, can result in a transition to the *Business-IT partnership* group; still, this transition is even more difficult than for the *Business-IT duopoly* group.

Feudalism is quite an undesirable situation in terms of further development since top management has not actually recognized the nature of digital transformation and the IT department is unable to take up the leading role in progress or as a strategic contributor. In these cases, when there is no technological push nor any real strategic business pull, it is quite likely the organization will remain in this position. In such companies, the coordinator role of CDOs is less plausible; instead, they probably act as digital evangelists or digital entrepreneurs (Singh & Hess, 2017). Given that this is obviously more of a business pull, the prospects for further development in the direction of *Business monarchy* are greater than in the direction of *IT monarchy*. A prerequisite for transitioning to *Business monarchy* is for top management to recognize the importance of digital transformation, where successful local projects can provide important stimuli. In any case, it is necessary to avoid developing in the direction of the *Business-IT duopoly*, which may represent a dead spot. *Feudalism* should not be confused with a pervasive IT organization in which, despite the involvement of different departments and more distributed roles, the strong coordination of IT's development across the organization is needed.

While the **Business monarchy with IT outsourced** group is making its very first digital transformation steps, the most promising movement was that top management has taken on the responsibility. Nevertheless, they will have to establish strategic directions for digital transformation and involve people with IT knowledge and skills who are capable of understanding digital IT opportunities and limitations. It appears that having the CIO or CDO onboard would be a major step towards achieving significant results of digital transformation efforts. Certainly, not all companies in this group will be able to move to another group, and this would not always be justified. However, when they appoint an appropriately skilled CIO with a balanced business and IT role, this could be the first move towards a successful *business-IT partnership* situation.

5.3 Implications

By identifying patterns of digital transformation, we have answered the first research question (Q1) about the typical combinations of key actors in digital transformation, their roles and interplay. We have analyzed their main characteristics (Q3) and their importance for successful digital transformation. Furthermore, when looking for the answer to the second research question (Q2) about the patterns that are connected with higher digital maturity, we have found that earlier partial recommendations concerning the key actors in digital transformation (Horlach et al., 2016; Matt et al., 2015; Peppard, 2018; Tumbas et al., 2017) are simultaneously both correct and incorrect. It is namely possible to achieve high levels of digital maturity with either CDOs, bimodal IT operations or existing structures, but none of these ensures success in itself. Thus, the main theoretical contribution of this study is therefore the key finding that successful digital transformation is more about the

roles and their interplay; that is, how different (key) actors collaborate to co-create value. It is crucial that organizations properly define the responsibilities for digital transformation, give attention to orchestrating the activities, create a balance between stability and flexibility, attribute strategic importance to the digital transformation, and understand the latter as a business change. This is of value also from the practical point of view, as further elaborated below where also some practical guidelines for organizations are given.

One of the most important issues seems to be the orchestration of different aspects, such as new digital IT, legacy systems, business processes and business model changes, customer experience improvements, understanding the business value, etc. It appears optimal if the role of the orchestrator is played by a business-oriented CIO (the *Business-IT partnership* group). Otherwise, someone else must take on this role, for example, top management itself, CDO, or other structures outside of the IT department. The finding that there is also a relatively high share of companies where other key actors are involved, especially R&D and marketing, shows that pervasive IT organizations are evolving (Peppard, 2018). However, a pervasive IT organization is impossible without proper orchestration. Furthermore, a strategic focus on digital transformation seems to be a crucial factor. For almost all of the groups, the digital maturity score becomes considerably higher when the digital transformation strategy is included as an integral part of the business strategy.

There are significant differences in maturity scores depending on the position of the CIO and the existence of IT departments. In other words, the strategic role of IT is important. Accordingly, organizational patterns are placed according to the role of the IT department and the level of digital maturity in Figure 1. As discussed above, an IT department which is exclusively a service or solution provider can impede digital transformation (the *Business-IT duopoly* group) if a gap exists between business and IT and the digital transformation is not properly orchestrated.

Companies can also organize digital transformation without the IT department being on board (the *Business monarchy* and *Feudalism* groups). However, there is a big difference if top management assumes the orchestration is (in the *Business monarchy* group) or is not (in the *Feudalism* group) evident in the level of digital maturity. In companies without an orchestrator role in the existing structures, parallel structures (e.g., CDOs or whole departments established due to the digital transformation) evolve and adopt that role. Moreover, IT departments in these companies have to do something to avoid becoming secondary players in digital transformation by having related activities outsourced.

Undoubtedly, an optimal case is when IT takes on the role of a strategic contributor and orchestrator, when mutual trust and respect between management and IT is established, and the importance of digital transformation is recognized. Yet, for various reasons, such as the historical development of IT, personality traits, management or IT capabilities, in many organizations these circumstances are impossible or unreasonable (Krotov, 2015).

5.4 Limitations and avenues for future research

The results of this study should be considered in light of some important limitations. Foremost, because this is the first attempt to analyze the interplay of actors based on service-dominant logic, the methodological approach used only allows for a broad view of the patterns. The findings of this study have several important implications for research and practice as discussed above. In order to better understand these patterns and reasons for them, identify other possible key actors and the details of interrelationships between the actors and their roles, norms and beliefs, we propose the next step in the research to be exploratory with the intent to provide grounds for hypotheses development and testing.

There are several questions that arise from the results and that require further research. One of the most important ones is the changing role of IT departments. While past studies suggested that the business role of IT departments should have increased, the results of this research show a reverse trend of increased technological roles. Nevertheless, some IT departments have managed to take an important part in the digital transformation efforts of their companies, but many of them mostly take care of traditional IT infrastructure. Further studies could reveal the root reasons for this situation, whether this is related to the increasingly pervasive nature of IT, the position of CIO, or whether this occurs for some other reasons. Another important question for further research is identifying different dimensions of digital transformation and its actors, considering contingency factors and how to efficiently orchestrate them. Nevertheless, despite these open questions that remain for further research, we hope that this study may serve as guidance for practitioners seeking to increase returns on their digital transformation efforts.

6 CONCLUSION

Organizations should be aware that several different approaches can bring a successful digital transformation. They need to consider contingency factors such as industry competitiveness level, opportunities, historical development, skill sets and mindsets that their current key actors possess, and similar when defining roles to be held in the digital transformation. In particular, it is important to ensure orchestration of the activities and roles. The identified patterns can inform companies about their existing positions and they can then decide which of the evolutionary paths to follow based on their current situation.

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